

# Notes on *Eucalyptus* ser. *Psathyroxyla* Blakely (Myrtaceae) and other 'Ash group' eucalypts

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## Summary

Bean, A.R. (1997). Notes on *Eucalyptus* ser. *Psathyroxyla* Blakely (Myrtaceae) and other 'Ash group' eucalypts. *Austrobaileya* 5(1): 125–135. A key to the species of the New England Blackbutts and Scribbly Gums (*E.* ser. *Psathyroxyla* Blakely) of south-eastern Australia is provided. The new species *Eucalyptus montivaga* A.R.Bean is described and illustrated. The species related to *E. montivaga* are described and their distributions mapped. *E. microcodon* L.A.S.Johnson & K.D.Hill is reduced to synonymy with *E. codonocarpa* Blakely & McKie.

Keywords: *Eucalyptus*, *Eucalyptus andrewsii*, *Eucalyptus campanulata*, *Eucalyptus racemosa*, *Eucalyptus montivaga*, *Eucalyptus microcodon*, Myrtaceae, Ash group, Scribbly Gums.

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## Introduction

The Ash group of *Eucalyptus* was accurately defined by Pryor and Johnson (1971), as informal *E.* series *Obliquae* L.D.Pryor & L.A.S.Johnson. The group is characterised by buds with a single operculum and inflexed or irregularly flexed stamens, and seedlings in which the leaves are opposite for only a few pairs, then falcate and pendulous (Brooker 1977). Brooker proposed two groups of Ashes, which have become known as 'Blue Ashes' and 'Green Ashes'. These are considered to be monophyletic groups (Ladiges et al. (1989,1992). Ash-eucalypt species are found in coastal and near-coastal areas of south-eastern Australia, from near Mackay in Queensland to Tasmania, and as far west as Kangaroo Island in South Australia. Greatest species diversity is found in central to southern New South Wales, where a number of restricted endemics are located.

*Eucalyptus* ser. *Psathyroxyla* Blakely originally included only the 'Scribbly Gums', but was expanded by Chippendale (1988) to include the related New England Blackbutts and Silvertop Ashes.

The 'New England Blackbutts' of north-eastern New South Wales include the long-standing species *E. andrewsii* Maiden and

*E. campanulata* R.T.Baker & H.G.Sm., and the recently named *E. olida* L.A.S.Johnson & K.D.Hill. A fourth New England Blackbutt, *E. montivaga* sp. nov., is relatively widespread (though very sporadically distributed) in mountainous areas from Toowoomba to Eungella. In recent years, it has been variously identified as *E. andrewsii*, *E. andrewsii* subsp. *andrewsii* (Chippendale 1988), *E. andrewsii* subsp. *campanulata* (Johnson & Blaxell 1973), or an intergrade between the latter two taxa (Boland et al. 1984).

The Mallee-ashes of the Green Ash group (informal *E.* subseries *Strictinae* L.D.Pryor & L.A.S.Johnson) are taxonomically difficult. Three taxa have been named from northern New South Wales and Queensland: *E. approximans* Maiden was named from Barren Mountain (near Dorrigo) in 1919. *E. codonocarpa* Blakely & McKie was named from Pheasant Mtn (near Guyra) in 1930. More recently, *E. microcodon* L.A.S.Johnson & K.D.Hill was named from Mt Barney (in far southern Queensland) in 1991. The identity of the MacPherson Range/Mt Barney mallees, and the rank and circumscription of '*codonocarpa*' have been contentious issues for some years.

The term 'floral cavity' is used to describe the space between the base of the style and the underside of the distal part of the operculum in *Eucalyptus* spp.

**Taxonomy**

**Eucalyptus** ser. **Psathyroxyla** Blakely, Key  
Eucalypts 52 (1934). **Type:**  
*E. haemastoma* Sm. (lecto, fide  
Chippendale (1988)).

*Eucalyptus* subser. *Considenianae* Brooker  
& Slee, Muelleria 9: 84 (1996). **Type:**  
*E. consideniana* Maiden

**Key to the species of *Eucalyptus* ser. *Psathyroxyla***

1. Mallees ..... 2  
Trees ..... 3
2. Adult leaves 0.7–1.2 cm wide; fruit pyriform to campanulate ..... **3. *E. multicaulis***  
Adult leaves 1.5–3.5 cm wide; fruit obconical to hemispherical ..... **1. *E. remota***
3. Bark smooth throughout and marked by insect “scribbles” ..... 4  
Bark rough, persistent, at least on the trunk ..... 6
4. Adult leaves 1.0–1.6 cm wide, juvenile leaves broadly lanceolate ..... **11. *E. rossii***  
Adult leaves 1.3–2.6 cm wide, juvenile leaves broadly ovate ..... 5
5. Fruits 4–5 mm long ..... **9. *E. racemosa***  
Fruits 6.5–9 mm long ..... **10. *E. haemastoma***
6. Bark on trunk dark grey to black, furrowed ..... **2. *E. sieberi***  
Bark on trunk light grey, not furrowed ..... 7
7. Bark with prickly fibres, persistent to small branches ..... **4. *E. consideniana***  
Bark without prickly fibres; smooth bark on small and medium sized  
branches ..... 8
8. Branchlets usually glaucous; fruits hemispherical, inflorescence  
9–13-flowered; operculum conspicuously umbonate ..... **5. *E. andrewsii***  
Branchlets not glaucous; fruits obconical, campanulate or hemispherical;  
inflorescence 7–17-flowered; operculum minutely umbonate ..... 9
9. Fruits obconical or campanulate, 5.0–8.0 × 4.5–7.0 mm; staminodes rare  
or absent ..... 10  
Fruits hemispherical, 4.0–6.0 × 4.5–6.0 mm; staminodes consistently  
present ..... **8. *E. montivaga***
10. Style short, c. 1 mm long; fruits 5.0–7.0 × 4.5–5.5 mm; juvenile leaves  
broadly ovate ..... **6. *E. campanulata***  
Style long, c. 2.5 mm long; fruits 5.0–8.0 × 5.0–7.0 mm; juvenile leaves  
ovate ..... **7. *E. olida***

- 1. *Eucalyptus remota*** Blakely, Key Eucalypts 197 (1934). **Type:** South Australia, near Mt Taylor, Kangaroo Island, June 1907, *W. Gill* s.n. (holo: NSW n.v., fide Chippendale (1988)).

**Distribution and habitat:** *E. remota* is endemic to the western half of Kangaroo Island in South Australia, where it grows in mallee scrub on sandy or lateritised soils.

- 2. *Eucalyptus sieberi*** L.A.S. Johnson, Contr. New South Wales Natl. Herb. 3: 125 (1962). **Type:** New South Wales. CENTRAL TABLELANDS: Blackheath, April 1899, *J.H. Maiden* (holo: NSW n.v., fide Chippendale (1988)).

**Distribution and habitat:** *E. sieberi* extends from Wyong in New South Wales to near Melbourne, and in north-eastern Tasmania. It grows in woodland or forest at low to intermediate altitudes, on coarse textured soils.

- 3. *Eucalyptus multicaulis*** Blakely, J. & Proc. Roy. Soc. New South Wales 61: 172 (1927). **Type:** New South Wales. Kariong Trig, September 1925, *W.F. Blakely, D.W.C. Shireess & H. Bott* (holo: NSW n.v., fide Chippendale (1988)).

**Distribution and habitat:** *E. multicaulis* is of restricted distribution, including Blue Mountains, east of Rylstone and the Budawang Range. It occurs on broad ridge-tops in sandstone areas, on shallow or skeletal soils.

- 4. *Eucalyptus consideniiana*** Maiden, Proc. Linn. Soc. New South Wales 2nd ser., 29: 475 (1904). **Type:** numerous syntypes held at NSW n.v., fide Chippendale (1988).

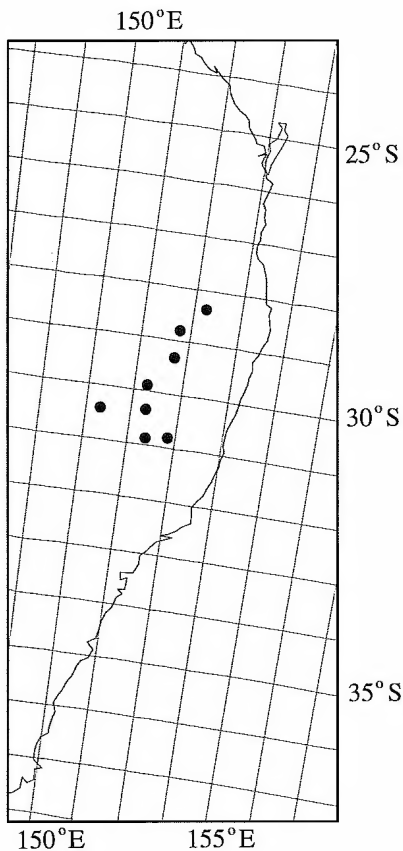
**Distribution and habitat:** *E. consideniiana* extends from near Sydney almost to Melbourne, usually close to the coast, on poor sandy soils.

- 5. *Eucalyptus andrewsii*** Maiden, Proc. Linn. Soc. New South Wales, 2nd ser., 29: 472 (1904). **Type:** New South Wales. NORTHERN TABLELANDS: Tingha, 16 October 1903, *R.H. Cambage* s.n. (lecto: (here designated) NSW [NSW 335599]).

Tree to 25 m tall. Bark on trunk and larger branches rough, persistent, finely fibrous, grey; small branches smooth, grey or white; branchlets usually glaucous. Lignotuber present. Seedling leaves opposite for c. 8 pairs. Petioles (3rd pair) c. 4 mm long. Juvenile leaves alternate, petiolate, broadly ovate, falcate, twisted vertically, apex acute. Adult leaves alternate, petiolate, lanceolate, 10–14 × 1.7–2.4 cm, acuminate, oblique, concolorous, bluish-green; lateral veins widely spaced, at c. 30–40° to midrib, reticulation sparse, intramarginal vein distinct, c. 1 mm from margin, oil gland density unknown, glands of various sizes, many per areole. Inflorescence simple, axillary; umbellasters 9–13 flowered; peduncles terete, 7–20 mm long; pedicels 2.0–5.5 mm long. Mature buds clavate, c. 4 × 3 mm. Operculum single, hemispherical, conspicuously umbonate. Filaments inflexed, anthers versatile, reniform, dehiscing by confluent slits, staminodes absent or rarely present. Floral cavity c. 2.5 mm long. Style c. 1.0 mm long at anthesis; stigma blunt. Fruit hemispherical, 6.0–6.5 mm long, 6.0–8.0 mm diameter, 4(5)-locular, disc forming a broad rim, level or slightly raised; valves at rim level. Seeds cuboid or pyramidal, brown-black, chaff similar but paler.

**Selected specimens:** Queensland. DARLING DOWNS DISTRICT: Hellhole Gorge, NE of Yangan, Oct 1996, *Bean* 10932 (BRI, CANB); Wyberba, hilltop among rocks, Jan 1933, *Blake* 4570 (BRI); Thulimbah, Jul 1958, *Blake* 20403 (BRI, NSW); Dalveen, Nov 1976, *Clarkson* 309 & *Byrnes* (BRI); Cottonvale, Sep 1954, *Devereux* s.n. (BRI); just W of Glen Aplin, Nov 1946, *Everist & Webb* 1374 (BRI); at Mt Norman walking track entrance, Mt Norman–Wallangarra road, Girraween NP, Jun 1994, *Grimshaw* G758 & *Halford* (BRI, NSW); Fletcher, Oct 1933, *White* 9392 (BRI). New South Wales. NORTHERN TABLELANDS: Silent Grove–Torrington road, 14.1 km N of Torrington, Jan 1995, *Bean* 8251 (BRI, NSW); 5.2 km from McDonald River crossing on Uralla Rd., Sep 1992, *Brooker* 11178 (BRI, CANB, NSW); 23.7 km NNW Armidale towards Bundarra, Apr 1975, *Chippendale* GC1252 & *Brennan* (BRI, CANB); 2.7 km E along the Flagstone Creek track from the Gulf Road, c. 18 km (direct) just W of N of Emmaville, Oct 1990, *Coveny* 14639 et al. (BRI, NSW); 5 km E of Mt Lindsay on Barraba fire trail, Aug 1986, *Hill* 2112 (BRI, CANB, NSW); Borrolong, 18 miles [29 km] SW of Guyra, Oct 1928, *McKie* s.n. (BRI).

**Distribution and habitat:** *E. andrewsii* is widespread on the western parts of the New England Tableland, mostly in New South Wales, but extending to Queensland on the 'Granite Belt' around Stanthorpe, and at Hellhole Gorge near Yangan (Map 1). It grows on infertile siliceous soils on hills and mountains.



Map 1. Distribution of *E. andrewsii*.

**Phenology:** Flowers are recorded from December to February.

**Notes:** Maiden did not choose a lectotype for *E. andrewsii* in his 'Critical Revision of the Genus Eucalyptus', as was asserted by Chippendale (1988).

**6. Eucalyptus campanulata** R.T.Baker & H.G.Sm., J. & Proc. Roy. Soc. New South Wales 45: 288 (1912); *E. andrewsii* subsp. *campanulata* (R.T.Baker

& H.G.Sm.) L.A.S.Johnson & Blaxell, Contr. New South Wales Natl. Herb. 4: 381 (1973). **Type:** New South Wales. Northern TABLELANDS: Tenterfield, December 1909, C.F. Laseron s.n. (holo: NSW; iso: NSW).

Tree to 35 m tall. Bark on trunk and larger branches rough, persistent, finely fibrous, grey; small branches smooth, grey or white; branchlets not glaucous. Lignotuber present. Seedling leaves opposite for c. 8 pairs. Petioles (3rd pair) c. 4 mm long. Juvenile leaves alternate, petiolate, broadly ovate, falcate, twisted vertically, apex acute. Adult leaves alternate, petiolate, lanceolate, 10–13 × 1.1–1.8 cm, acuminate, oblique, concolorous, bluish-green; lateral veins widely spaced, at c. 30–40° to midrib, reticulation sparse, intramarginal vein distinct, c. 0.5–1.0 mm from margin, oil glands numerous, 450–600/square cm, of various sizes, many per areole. Inflorescence simple, axillary; umbellasters 9–17-flowered; peduncles terete, 8–18 mm long; pedicels 4–6 mm long. Mature buds clavate, c. 4 × 3 mm. Operculum single, hemispherical, minutely umbonate. Filaments inflexed, anthers versatile, reniform, dehiscing by confluent slits, staminodes absent or rarely present. Floral cavity c. 2.0 mm long, c. 1 mm long at anthesis; stigma blunt. Fruit campanulate to obconical, 5.0–7.0 mm long, 4.5–5.5 mm diameter, 4(5)-locular, disc forming a broad-rim, level or slightly concave; valves slightly enclosed. Seeds cuboid or pyramidal, brown-black, chaff similar but paler.

**Selected specimens:** Queensland. DARLING DOWNS DISTRICT: The Steamers, E of Emu Vale, May 1990, *Bean* 1556 (BRI); c. 1 km ENE of Gambubal Forest station, E of Warwick, Oct 1996, *Bean* 10969 (BRI, CANB); 9 miles [14 km] E of Wyberba on road to Eukey, Oct 1970, *Fisher* 224 (BRI); Mt Huntley, Oct 1992, *Forster* PIF 11820 et al. (BRI); Wilsons Peak, May 1938, *Goy & Smith* 405 (BRI). MORETON DISTRICT: upper slopes of Mt Bangalora, SW of Boonah, May 1990, *Bean* 1561 (BRI); Mt Ernest, SW of Rathdowney, Apr 1993, *Bean* 6030 (BRI); Mt Barney, Aug 1936, *Goy* 130 (BRI); Mt Maroon, Aug 1964, *Smith* 12143 (BRI); on Dave's Creek track, Lamington NP, Sep 1952, *Blake* 19071 (BRI, NSW); Springbrook, Sep 1929, *White* 6245 (BRI); Mt Castle, Laidley valley, Mar 1936, *White* 10352 (BRI). New South Wales. NORTHERN TABLELANDS: North Obelisk, Oct 1990, *Bean* 2494 (BRI, NSW); Guy Fawkes, Mar 1914, *Boorman* s.n. (BRI); near

Jeogla, Feb 1973, *Brooker* 3913 (BRI); 26.1 km SE of Apsley Falls turn off on Oxley Highway, Apr 1975, *Chippendale* GC1259 & *Brennan* (BRI, CANB); 0.6 miles [1.0 km] S of Liston, Jun 1968, *Johnston & Chippendale* 605 (BRI, CANB); Mt Royal, 25 miles [40 km] E of Aberdeen, Mar 1960, *Storoy* 7183 (BRI, NSW); Nundle, Jul 1913, *Swain* s.n. (BRI); Dorrigo S.F., on high hills above Briggsdale, Oct 1930, *White* 7525 (BRI).

**Distribution and habitat:** *E. campanulata* is widespread on the eastern parts of the New England Tableland, and on Barrington Tops. In Queensland, it is mainly confined to the McPherson Range and Main Range, with minor occurrences to the south-east of Stanthorpe (Map 2). It grows as a component of tall wet sclerophyll forest, on sandy to loamy soils, on hills and tablelands.

**Phenology:** Flowers are recorded for October and November.

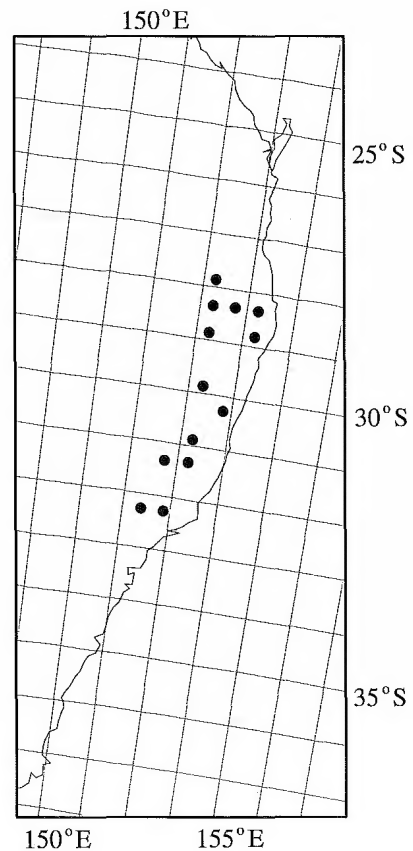
**7. *Eucalyptus olida*** L.A.S. Johnson & K.D. Hill, *Telopea* 4: 103 (1990). **Type:** New South Wales. NORTHERN TABLELANDS: 4.2 km from the Gwydir Highway on the north-west fire trail, Gibraltar Range N.P., 10 September 1985, *K.D. Hill* 1276 & *L. Johnson* (holo: NSW; iso: CANB, MEL).

Tree to 30 m tall. Bark on trunk and larger branches rough, persistent, flaky-fibrous, grey; small branches smooth, grey or white; branchlets not glaucous. Lignotuber present. Seedling leaves opposite for several pairs. Petioles (3rd pair) of unknown length. Juvenile leaves alternate, petiolate, broadly ovate, falcate, twisted vertically, apex acute. Adult leaves alternate, petiolate, lanceolate, 9–16 × 1.0–2.7 cm, acuminate, oblique, concolorous, bluish-green; lateral veins widely spaced, at c. 30–40° to midrib, reticulation sparse, intramarginal vein distinct, c. 1 mm from margin, oil glands of various sizes, many per areole. Inflorescence simple, axillary; umbellasters 7–11 - flowered; peduncles terete, 10–19 mm long; pedicels 3–5 mm long. Mature buds clavate, c. 4 × 3 mm. Operculum single, hemispherical, minutely umbonate. Filaments inflexed, anthers versatile, reniform, dehiscing by confluent slits, staminodes absent. Floral cavity c. 2.5 mm long. Style c. 2.5 mm long at anthesis, as long as floral cavity; stigma blunt. Fruit campanulate to obconical, 5–8 mm long,

5–7 mm diameter, 4(5) - locular, disc forming a broad rim, level or slightly concave; valves at rim level. Seeds cuboid or pyramidal, brown-black, chaff similar but paler.

**Specimens examined:** **New South Wales.** NORTHERN TABLELANDS: entrance to Waratah Trig track from Gwydir Hwy, Gibraltar Range N.P., Nov 1990, *Brooker* 10594 (BRI, CANB); 4.2 km from highway on W end of north-west fire trail, Gibraltar Range N.P., Sep 1985, *Hill* 1277 & *Johnson* (BRI); Gibraltar Range NP, Grassy Creek 4WD track, Sep 1985, *Williams* et al. NRAC4 (BRI, NSW); Poverty Point Rd, 25 km off Tenterfield-Casino road, Dec 1986, *Williams* s.n. (BRI, NSW); 4 km NW of Surface Hill by road, Oct 1984, *Wood* 12a (BRI, NSW).

**Distribution and habitat:** *E. olida* is known from two areas of northern New South Wales; the Poverty Point area east of Tenterfield, and the Gibraltar Range, between Glen Innes and Grafton (Map 4). It grows in woodland or open forest on infertile sandy soils.



Map 2. Distribution of *E. campanulata*.

**Phenology:** Flowers have been recorded in January.

**Notes:** *E. olida* is very similar in appearance to *E. campanulata* and *E. andrewsii*, but differs fundamentally from those species by its long style which extends the full length of the floral cavity. *E. campanulata*, *E. andrewsii*, *E. montivaga* and the ‘Scribbly Gums’ all have short styles, which extend only halfway (or less) across the floral cavity. Despite this, I feel that *E. olida* is best placed within *E. ser. Psathyroxyla*.

Hill (1991) stated that *E. olida* has “outer stamens infertile” (p. 139) and “outer stamens often infertile” (p. 140). This is in stark contrast to Johnson & Hill (1990), where it is stated that “anthers” are “all fertile” in *E. olida*. The present author’s observations support the latter view, i.e. that the stamens are all fertile.

### 8. *Eucalyptus montivaga* A.R.Bean sp. nov.

affinis *E. racemosae* et *E. campanulatae*; ab illa cortice scabra fibrosa et pedicellis longioribus, ab hac fructibus hemisphaericis (non obconicis usque campanulatis) instructis valvis aequantibus labrum hypanthii (non inclusis inter id) et staminodiis semper praesentibus differt. **Typus:** Queensland. BURNETT DISTRICT: 5 km SE of Gallangowan, 11 September 1996, A.R. Bean 10692 (holo: BRI; iso: CANB, MEL, NE, NSW, distribuendi).

#### *Eucalyptus haemastoma* var. *inophloia*

C.T.White, Queensland Agric. J. 2nd ser. 14: 70 (1920). **Type:** Queensland. DARLING DOWNS DISTRICT: Toowoomba, in 1919, C.T.White s.n. (syntypes at BRI).

Tree to 30 m tall. Bark on trunk and larger branches rough, persistent, finely fibrous, grey; small branches smooth, grey or white; branchlets not glaucous. Lignotuber present. Seedling leaves opposite for c. 7 pairs. Petioles (3rd pair) c. 2 mm long. Juvenile leaves alternate, petiolate, broadly ovate, 100–140 × 32–55 mm, falcate, twisted vertically, apex acute. Adult leaves alternate, petiolate, lanceolate, 9–16.5 × 1.1–1.9 cm, acuminate, oblique, concolorous, bluish-green; lateral

veins widely spaced, at c. 30–40° to midrib, reticulation sparse, intramarginal vein distinct, c. 1 mm from margin, oil glands numerous, 450–650/square cm, of various sizes, many per areole. Inflorescence simple, axillary; umbellasters 11–17-flowered; peduncles terete, 8–14 mm long; pedicels 3.5–5.5 mm long. Mature buds clavate, c. 4 × 3 mm. Operculum single, hemispherical, minutely umbonate. Filaments inflexed, anthers versatile, reniform, dehiscing by confluent slits, staminodes present amongst outer whorls of all flowers. Floral cavity c. 2.0 mm long. Style c. 1.0 mm long at anthesis; stigma blunt. Fruit hemispherical, 4.0–6.0 mm long, 4.5–6.0 mm diameter, 4(5)-locular, disc forming a broad rim, level or slightly convex; valves at rim level. Seeds cuboid or pyramidal, brown-black, chaff similar but paler. Fig. 1.

**Selected specimens: Queensland.** SOUTH KENNEDY DISTRICT: Dicks Tableland, Eungella N.P., Sep 1991, *Bean* 3668 (BRI); Swampy Ridge, W of Eungella township, May 1992, *Bean* 4452 (BRI, CANB); Dalrymple Heights, Mackay, Feb 1957, *Hickey* 57/220 (BRI); N of Crediton, 6 miles [10 km] W of Eungella, Jan 1957, *Muir* 57/111 (BRI). PORT CURTIS DISTRICT: summit of Mt Stanley, Many Peaks Range, Feb 1988, *Bean* 745 (BRI); Kroombit Tops, Jul 1976, *Brooker* 5274 (BRI, CANB); Kroombit Tops, c. 60 km SW of Gladstone, Jun 1977, *Crisp* 2809 (AD, BRI, CANB, L, NSW); T.R. 18, 40 miles [64 km] SSW of Gladstone, Oct 1964, *Epp* s.n. (BRI); Bulburin, Aug 1957, *Webb & Tracey* 3308 (BRI). BURNETT DISTRICT: summit of Boolbunda Rock, near Mt Perry, Aug 1986, *Bean* 478 (BRI); Widgee–Manumbar road, May 1985, *Brooker* 9021 (BRI); summit of Mt Woowoonga, Dec 1986, *Forster* PIF2753 (BRI, NSW); Mt Perry summit, Oct 1995, *Sparshott* KMS644 & *Sparshott* (BRI, CANB, MEL). WIDE BAY DISTRICT: Mt Walsh N.P., south of Biggenden, May 1994, *Bean* 7696 (BRI); Mt Molangul, SF 391, SW of Miriam Vale, Sep 1995, *Bean* 8935 & *Robins* (BRI, CANB); on Jimna–Kenilworth road, c. 1.5 km NE of Funnels hut road turnoff, Oct 1982, *McDonald* 3654 & *Williams* (BRI, CANB, NSW). DARLING DOWNS DISTRICT: Nelson Street reservoir, Toowoomba, Jul 1996, *Bean* 10452 (BRI, CANB). MORETON DISTRICT: Hartmann Park, Crows Nest, Aug 1994, *Bean* 7843 (BRI, NSW); east of ‘Fair Hills’, SW of Cooyar, Aug 1996, *Bean* 10619 (BRI, CANB, NSW).

**Distribution and habitat:** *E. montivaga* occurs in the Dicks Tableland to Eungella area west of Mackay, and between Kroombit Tops and Toowoomba (Map 3). Despite this extensive distribution, it is an uncommon species, restricted to small populations on shallow sandy soils derived from acid volcanic rocks. In the Dicks Tableland to Eungella area, it grows only

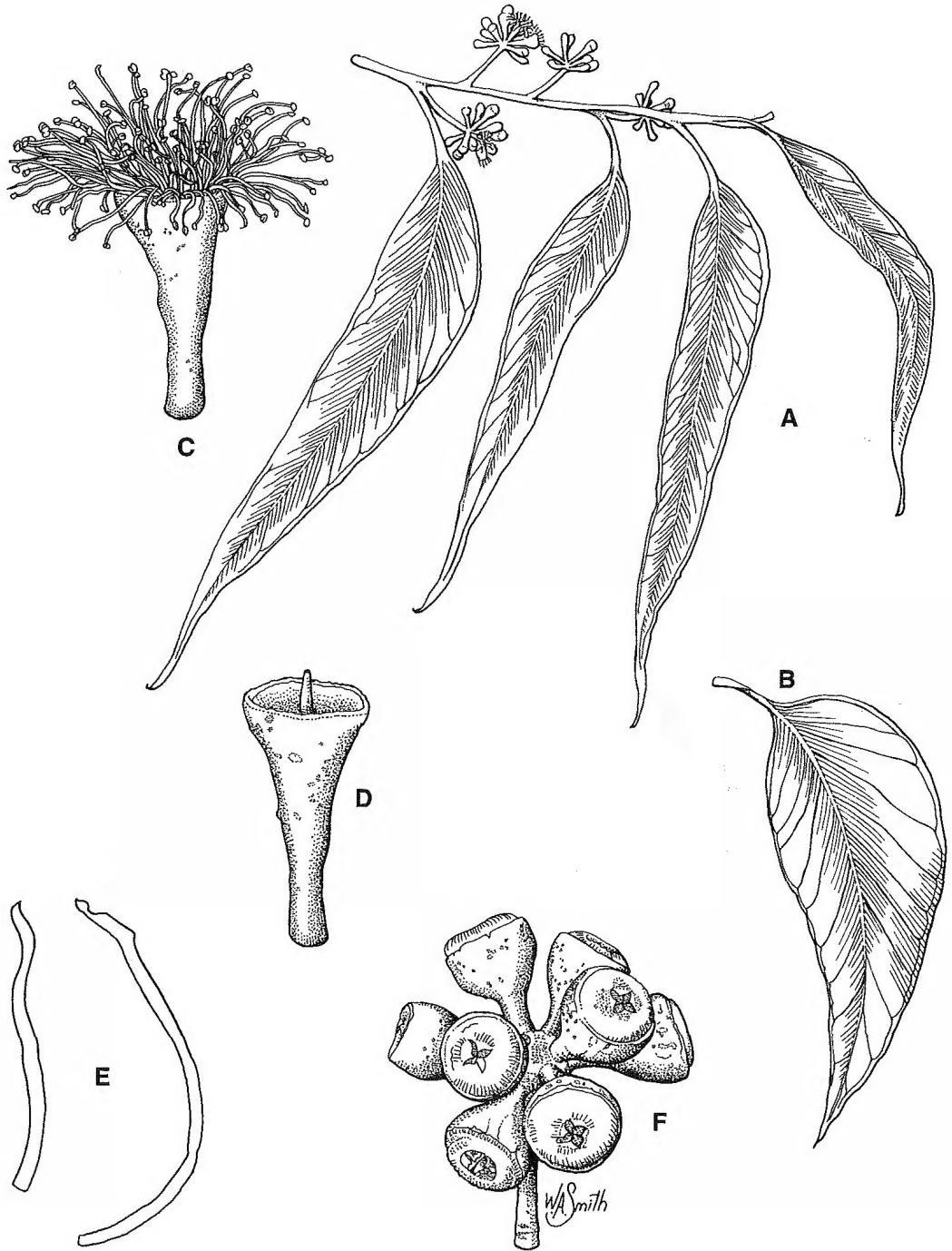
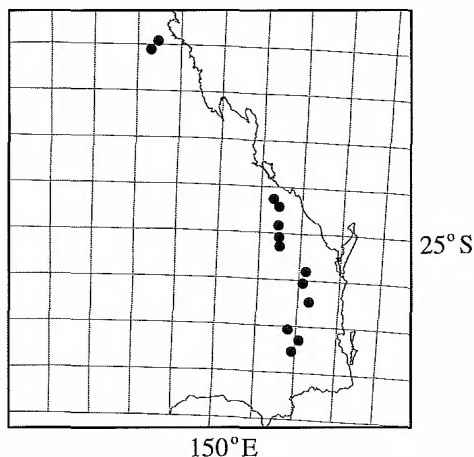


Fig. 1. *Eucalyptus montivaga*. A. Adult leaves and inflorescences  $\times 0.6$ . B. Juvenile leaf  $\times 0.6$ . C. Flower  $\times 5$ . D. flower with stamens removed, showing short tapered style  $\times 5$ . E. stamines  $\times 16$ . F. fruits  $\times 2$ . All from *Bean* 10692.

at altitudes above about 900 metres. Between Kroombit Tops and Toowoomba, most populations are above 600 metres, although it may occur at lower altitude on steep southerly slopes.



Map 3. Distribution of *E. montivaga*.

**Phenology:** Flowers have been recorded between July and January.

**Notes:** *E. montivaga* differs from *E. racemosa* by its grey, fibrous bark persistent on the trunk and larger branches, and the pedicels 3.5–5.5 mm long (pedicels 1.5–4 mm long for *E. racemosa*). *E. montivaga* differs from *E. campanulata* by its hemispherical fruits (vs. obconical to campanulate) and by the consistent presence of staminodes in the flowers.

**Conservation status:** While *E. montivaga* occurs only very sporadically along the coastal ranges of Queensland, it is not rare or threatened at this time.

**Etymology:** The species epithet *montivaga* is from the Latin, meaning 'wandering over mountains' and refers to the sporadic mountain habitat of the species.

**9. *Eucalyptus racemosa*** Cav., Icon. 4: 24 (1797). **Type:** New South Wales. Botany Bay, in 1793, *Née* s.n. (holo: MA, photo!).

*E. micrantha* DC., Prodr. 3: 217 (1828);  
*E. haemastoma* var. *micrantha* (DC.)

Benth., Fl. Austral. 3: 212 (1867). **Type:** New Holland, in 1823, *F.W. Sieber* 497 (holo: G; iso: G, W), fide Chippendale (1988).

*E. signata* F.Muell., J. Proc. Linn. Soc., Bot. 3: 85 (1859); *E. micrantha* var. *signata* (F.Muell.) Blakely, Key Eucalypts 219 (1934); *E. racemosa* var. *signata* (F.Muell.) R.D.Johnst. & Marryatt, Comm. For. Timber Bur. Leaflet 92: 20 (1965). **Type:** Queensland. MORETON DISTRICT: Brisbane River, undated, *F. Mueller* s.n. (holo: MEL; iso: K), fide Chippendale (1988).

*E. haemastoma* var. *capitata* Maiden, Crit. Revis. Eucalyptus 1: 319 (1908), **syn. nov.** **Type:** New South Wales. CENTRAL TABLELANDS: Mt Victoria, April 1889, *J.H. Maiden* (holo: NSW).

*E. haemastoma* var. *sclerophylla* Blakely, Key Eucalypts 218 (1934); *E. sclerophylla* (Blakely) L.A.S.Johnson & Blaxell, Contr. New South Wales Natl. Herb. 4: 381 (1973), **syn. nov.** **Type:** New South Wales. CENTRAL TABLELANDS: Mt Victoria, November 1899, *J.H. Maiden* (holo: NSW).

Tree to 25 m tall. Bark smooth throughout, grey or white, marked by insect scribbles; branchlets not glaucous. Lignotuber present. Seedling leaves opposite for c. 8 pairs. Petioles (3rd pair) c. 2 mm long. Juvenile leaves alternate, petiolate, broadly ovate, falcate, twisted vertically, apex acute. Adult leaves alternate, petiolate, lanceolate, 9–15 × 1.3–2.6 cm, acuminate, oblique, concolorous, bluish-green; lateral veins widely spaced, at c. 30–40° to midrib, reticulation sparse, intramarginal vein distinct, c. 1.0 mm from margin, oil glands numerous, 400–600/square cm, of various sizes, many per areole. Inflorescence simple, axillary; umbellasters 9–17-flowered; peduncles terete, 9–13 mm long; pedicels 1.5–4.0 mm long. Mature buds clavate, c. 3.5 × 2.5 mm. Operculum single, hemispherical, minutely umbonate. Filaments inflexed, anthers versatile, reniform, dehiscing by confluent slits, staminodes present in outer whorls of all



flowers. Floral cavity c. 2.0 mm long. Style c. 0.7 mm long at anthesis; stigma blunt. Fruit hemispherical, 4.0–5.0 mm long, 5.0–6.0 mm diameter, 4(5)-locular, disc forming a broad rim, slightly convex to slightly concave; valves at rim level. Seeds cuboid or pyramidal, brown-black, chaff similar but paler.

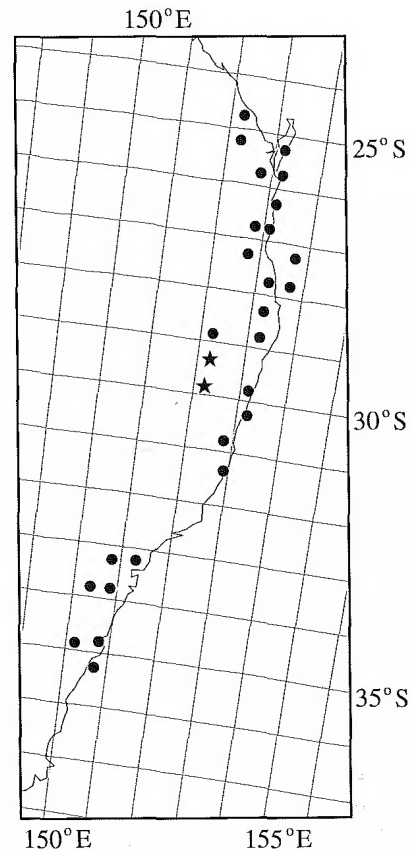
**Selected specimens: Queensland.** WIDE BAY DISTRICT: Wide Bay Military Training Area, Sep 1980, *Adams* 3541 (BRI, CANB); beside Elliot River, 200 m N of Coonarr turnoff, May 1985, *Bean* 200 (BRI); Mt Kandanga, west of Imbil, Apr 1993, *Bean* 5980 (BRI, NSW); Fraser Island, Oct 1921, *White* 1334 (BRI); Tin Can Bay, Sep 1943, *White* 12252 (BRI). MORETON DISTRICT: SF 531, SW of Esk, 4.5 km from Esk–Toowoomba road, Apr 1989, *Bean* 1020 (BRI); Mt Gravatt graveyard, Jan 1972, *Brooker* 3399 (BRI, CANB); Chester road, 2.5 km E of Advancetown–Numinbah road, Feb 1977, *Brooker* 5556 (BRI, CANB, NSW); North Stradbroke Is., Feb 1973, *Durrington* s.n. (BRI); Deer Reserve SF, Gregors creek, near Kilcoy, Apr 1994, *Grimshaw* G602 & *Figg* (BRI, NSW); below Mt Beerwah on E side, Oct 1993, *Slee & Lepschi* 3415 (BRI, CANB, NSW). **New South Wales.** NORTH COAST: Koonyum Range, W of Mullumbimby, Jul 1993, *Bean* 6179 (BRI); 1.5 km west of Red Rock, Aug 1985, *Foreman* 946 (BRI, CANB, MEL, NSW). CENTRAL TABLELANDS: Burrawang Ridge Rd., 1.6 km from Gap Rd, SE of Wingello, Mar 1995, *Brooker* 12138 (BRI, CANB, NSW); 1.6 km S of Mt Victoria towards Blackheath, Jul 1974, *Kleinig* DK130 (BRI, CANB). CENTRAL COAST: Great Western Highway, opposite Faulconbridge Railway station, Apr 1975, *Chippendale* GC1201 & *Brennan* (BRI); SW corner of Castlereagh S.F. off the Northern road, Sep 1984, *Coveny* 11883 & *Goodwin* (BRI, NSW). SOUTH COAST: c. 500 m NE of Wreck Bay village at the junction of Boorarla, Wreck Bay and Summercloud Bay roads, Aug 1991, *Lyne* 418 et al. (BRI, CANB, MEL, NSW).

**Distribution and habitat:** *E. racemosa* is widespread from Jervis Bay in New South Wales to Bundaberg and Fraser Island in southern Queensland (Map 4). It often grows on coastal lowlands on sandy soil, but also extends onto ranges on shallow soils derived from sandstone or rhyolite.

**Phenology:** Flowering can occur in almost every month of the year, with an apparent peak in the August–November period.

**Notes:** There appear to be no significant differences between the entities *E. racemosa*, *E. sclerophylla* and *E. signata*. In Hill (1991), these three ‘species’ are keyed using geography and the character of leaf glossiness. I have not found leaf glossiness to be diagnostic for Scribbly Gums as it can vary considerably

within a population. Since I have been unable to distinguish these entities either in the herbarium or in the field, I have included them in *E. racemosa* Cav.



Map 4. Distribution of \**E. olida* and ●*E. racemosa*.

**10. *Eucalyptus haemastoma* Sm.,** Trans. Linn. Soc. London 3: 286 (1797). **Type:** New South Wales. Port Jackson, in 1794, *J. White* (holo: LINN, microfiche BRI).

**Distribution and habitat:** *E. haemastoma* is confined to the Central Coast of New South Wales, to the north and south of Sydney. It grows on sandstone hills with sandy or ‘sandy clay’ soil.

**11. *Eucalyptus rossii* R.T.Baker & H.G.Sm.,** Res. Eucalypts 70 (1902). **Type:** New South Wales. CENTRAL TABLELANDS: Cow Flat, Bathurst, March 1901, *R.T. Baker*

s.n. (holo: NSW n.v., fide Chippendale (1988)).

**Distribution and habitat:** *E. rossii* is widely distributed in inland areas of New South Wales from Pilliga to south of Canberra. It prefers sandy to loamy soils, on low ridges in dry sclerophyll woodland.

#### Notes on some 'Green Ashes'

informal *Eucalyptus* subser. **Strictinae**  
L.D.Pryor & L.A.S.Johnson, A Classification of the Eucalypts 41 (1971).

**Eucalyptus approximans** Maiden, J. & Proc. Roy. Soc. New South Wales 53: 65 (1919). **Type:** New South Wales. NORTHERN TABLELANDS: Barren Mountain, in 1901, *H. Deane* s.n. (holo: NSW).

**Distribution and habitat:** *E. approximans* is endemic to Barren Mountain near Dorrigo in New South Wales. It grows on a trachyte mountainside with very little soil development, forming an almost pure stand.

**Eucalyptus codonocarpa** Blakely & McKie, Proc. Linn. Soc. New South Wales 55: 589 (1930); *E. approximans* subsp. *codonocarpa* (Blakely & McKie) L.A.S.Johnson & Blaxell, Contr. New South Wales Natl. Herb. 4: 453 (1973). **Type:** New South Wales. NORTHERN TABLELANDS: Pheasant Mtn, 2 miles [3 km] NE of Backwater, 30 October 1929, *E.N. McKie, T. Youman & W.F. Blakely* s.n. (holo: NSW; iso: BRI).

*E. microcodon* L.A.S.Johnson & K.D.Hill, *Telopea* 4(2): 348 (1991), **syn. nov.** **Type:** Queensland. MORETON DISTRICT: Mt Barney, south ridge, 17 May 1969, *C.R. Dunlop* s.n. (holo: NSW).

**Distribution and habitat:** *E. codonocarpa* extends from Mt Maroon in south-eastern Queensland to Glen Innes, northern New South Wales. It grows on rock outcrops of granite or rhyolite, where soil development is very limited.

**Notes:** *E. codonocarpa* is readily distinguished from *E. approximans* by its larger fruits, and broader leaves without raised oil glands when dry. However, the type of *E. microcodon* cannot be distinguished from *E. codonocarpa*. The distinguishing characters given by Hill & Johnson (1991) appear to be either not consistent or erroneous. The leaf dimensions, thickness and venation pattern differences between *E. microcodon* and *E. codonocarpa* (as cited by Hill & Johnson) are virtually indistinguishable. The cited difference in oil gland density is observable in some specimens but not in others. The fruit sizes of the two 'taxa' are not significantly different, and while the Springbrook to Mt Maroon material does more often possess 7-flowered inflorescences, this feature is also present in *E. codonocarpa* from the type locality.

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